REMARKS

Summary Of Office Action

In the present application, claims 1-17, 19, and 63-64 remain pending, and claims 20-62 are withdrawn from consideration. In the Final Office Action mailed January 27, 2003, the Examiner rejected claims 1-3, 6, 8, and 14-15 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,37,251 to Fayyad et al. ("Fayyad"); rejected claims 4-5 under 35 U.S.C. §103(a) as being obvious over Fayyad in view of U.S. Patent No. 5,671,381 to Strasnick et al. ("Strasnick et al."); rejected claims 7, 9-11, 16, 17, 19, and 63-64 under 35 U.S.C. §103(a) as being obvious over Fayyad in view of the IEEE paper "On Encouraging Multiple Views for Visualization" by J.C. Roberts; and rejected claims 12 and 13 under 35 U.S.C. §103(a) over Fayyad in view of IEEE Pattern Analysis and Machine Intelligence, "Handwritten Word Recognition Using Segmentation- Free Hidden Markov Model and Segmentation-Based Dynamic Programming Techniques," by Magdi Mohamed et al.

Summary of This Response

Applicants thank the Examiner for the courtesy extended in the interview of May 8, 2003, a summary of which is included below.

By this Amendment, Applicants add new claims 65-67. For the reasons discussed with the Examiner at the interview, and in light of the Amendments and following remarks, Applicants respectfully request the reconsideration and allowance of pending claims 1-17, 19, and 63-67.

Interview Summary

Applicants thank the Examiner for the courtesy extended during the interview of May 8, 2003 with inventor Dr. Jeffrey Saffer, and Applicants' representative Timothy Hsieh[1]. At the interview, Applicants discussed with the Examiner the pending claims and the cited art.

In the Office Action, and at the interview, the Examiner asserted that <u>Fayyad</u> discloses "a plurality of data types," as recited in claim 1. According to the Examiner, <u>Fayyad</u> discloses a numeric data type because it includes the number "30" in the first row, first column of the Table, a sequence data type, because the number "30" is a sequence of the digits "3" and "0," and a categorical type because "30" is representative of the Age, Income, Children, and Cars." Applicants respectfully disagreed, and, at the interview, demonstrated that all of the data types listed in the <u>Fayyad</u> reference are of type 'float,' a numerical data type (*See e.g.*, Col. 8, lines 19-20, 26-27, 31, and 35), and that, in the <u>Fayyad</u> system, the analysis "is only defined over numeric (continuous-valued) data since the ability to compute the mean is a requirement." (Col. 7, lines 52-54.) Accordingly, Applicants asserted that <u>Fayyad</u> discloses analysis of only numeric data, and fails to disclose at least "the plurality of data types" recited in claim 1.

In response to Applicants' arguments, the Examiner asserted that the claim, and specifically the terms "categorical" and "sequence," are simply "too broad", and that when given their broadest possible meanings, <u>Fayyed</u> discloses these features.

Without conceding that <u>Fayyad</u> discloses at least "a plurality of data types," Applicants discussed with the Examiner possible claim amendments that would clarify the claim terms. In particular, the Examiner indicated that a clarification of the claim language, such as by amending

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[1] The interview was also attended by Mark E. Dailey, an unregistered representative of Applicants.

"sequence data type" to "genomic sequence data type," and "categorical data type" to "nominal or ordinal categorical data type," in keeping with their ordinary use, both in the application and in the art, would overcome the cited art.

Detailed Response

Rejection of Claims 1-3, 6, 8, 14, and 15

The rejections of claims 1-3, 6, 8, 14, and 15 as being unpatentable under 35 U.S.C. §102(e) are respectfully traversed, since a prima facie case of anticipation has not been made by the Examiner. In order to properly anticipate Applicants' claimed invention under 35 U.S.C. §102(e), each and every element of the claim in issue must be found, either expressly described, or under principles of inherency, in a single prior art reference. Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the claim." *See* M.P.E.P. §2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F. 2d 1126, 1236 (Fed. Cir. 1989). Finally, "[t]he elements must be arranged as required by the claim." M.P.E.P. §2131. Applicants submit that these requirements have not been met for at least the following reasons.

Independent claim 1 recites a combination including, for example, "selecting a set of attributes associated with an object, wherein the attributes selected comprise a plurality of data types selected from a group consisting of a numerical data type, a text data type, a categorical data type, and a sequence data type." The Examiner asserted that claim 1 is anticipated by Fayyad, and, more specifically, asserted that Table 1, column 8, shows a "plurality of data types selected from a group consisting of a numerical data type, a text data type, a categorical data type, and a sequence data type," as claimed. Applicants respectfully disagree and submit that Fayyad discloses only a single data type, numeric data, and therefore fails to anticipate claim 1.

6

Applicants respectfully submit that <u>Fayyad</u> discloses only a single data type, numeric data. All of the data types analyzed in the <u>Fayyad</u> reference are of type 'float,' which Applicants respectfully submit is a numerical data type. (*See e.g.*, Col. 8, lines 19-20, 26-27, 31, and 35.) Furthermore, <u>Fayyad</u> explicitly cautions that its methods are "only defined over *numeric* (continuous-valued) data since the ability to compute the mean is a requirement." (Col. 7:52-54 (emphasis added)) For at least this reason, Applicants respectfully submit that the Examiner's arguments are misguided, as <u>Fayyad</u> explicitly admits its own inability to deal with non-numeric data. Accordingly, <u>Fayyad</u> cannot disclose "a plurality of data types" as claimed in claim 1.

Applicants respectfully submit that the Examiner's assertions indicate that a confusion between a "data type" and a "representation" of the data is represented. One of ordinary skill in the art would understand and appreciate that, in accordance with the present invention, a "data type" is indicative of the method(s) by which the data may be treated, analyzed, transformed, or otherwise utilized to give it meaning. For example, the numeric data of <u>Fayyad</u> may be analyzed or treated using K-means, calculating the mean, or by applying other mathematical formulae, while still maintaining meaning (Col. 7, lines 52-54). Application of these tools, however, to categorical data, for example, even if represented numerically, would not produce any meaningful result. By way of example, assuming that, under the Examiner's reasoning, the data in the Cars column of Table 1 is nominal categorical data, represented as numbers. For example, a "1" indicates ownership of a BMW, a "2" ownership of a Toyota, etc. Under these conditions, analyzing the categorical data using tools meant for numeric data types, such as by calculating the mean of this categorical data produces completely meaningless results. An attempt to calculate the mean of the numbers in this would be the equivalent of trying to average a "BMW"

with a "Toyota," and would simply have no meaning. However, as a numerical data type, where the data represents the number of cars owned, it would have meaning using these numerical analysis, because the average person would have 1.6 cars. Therefore, while Applicants admit that categorical or sequence data may be represented numerically (or textually), its representation does not, by itself, define its data type. The Examiner has not, and Applicants submit cannot, indicated any disclosure in Fayyad where data is treated other than as a numerical data type, and specifically, where Fayyad discloses "a plurality of data types selected from a group consisting of a numerical data type, a text data type, a categorical data type, and a sequence data type," as recited in claim 1. Accordingly, Applicants respectfully submit that Fayyad fails to disclose "a plurality of data types" as recited in claim 1.

For these reasons, Applicants submit that the Examiner has failed to set forth a *prima facie* case of anticipation of claim 1 over the Fayyad reference. Applicants therefore respectfully request reconsideration and allowance of claim 1.

Independent claim 2 recites a combination including, for example, "defining a uniform data structure for representing objects of different data types." The Examiner asserted, for the reasons discussed above, that Fayyad discloses "different data types." For the reasons discussed above, Applicants respectfully submit that Fayyad discloses only a single type of data, numerical, and therefore is insufficient as a matter of law to anticipate combination including, at least "defining a uniform data structure for representing objects of different data types," as recited in claim 2. Accordingly, Applicants respectfully submit that claim 2, and claims 3, 6, 8, 14, and 15 by virtue of their dependence therefrom, are allowable.

Rejection of claims 4 and 5

The rejections of claims 4 and 5 under 35 U.S.C. §103(a) are respectfully traversed because a *prima facie* case of obviousness has not been made by the Examiner. To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the references, taken alone or in combination must disclose or suggest each and every element recited in the claims. Second, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of these requirements must "be found in the prior art, and not be based on the applicant's disclosure." (*See* M.P.E.P. §2143) Applicants submit that these requirement have not been met for the following reasons.

Claims 4 and 5, by virtue of their dependence from claim 2, each recite a combination including, for example, "defining a uniform data structure for representing objects of different data types." With respect to claim 4, the Examiner admitted, and Applicants agree, that "Fayyad et al. do not explicitly disclose the method of claim 3 wherein said plurality of different data types comprise a combination of any three of numeric, reference string, categorical, and text data types." (*See* O.A. at p.6.) Furthermore, with respect to claim 5, the Examiner admitted, and Applicants agree, that "Fayyad et al do not explicitly disclose the method of claim 4 wherein said data types comprise numeric, sequence string, categorical, and text data." Instead, the Examiner asserted, with respect to claim 4, that "Strasnick et al. et al. disclose a method "for visualization of different data types comprising a combination of numeric, reference string, categorical, and in [sic] text data types," (*see* O.A. p.6), and with respect to claim 5 that "wherein said data types

9

comprise numeric, sequence string, categorical and text data types." (*See* O.A. p.7.) Applicants respectfully submit that the Examiner's assertion misses the mark.

Applicants respectfully submit that whether or not <u>Strasnick</u> discloses "a method for visualization of different data types," it does not disclose or suggest at least "defining a uniform data structure for representing objects of different data types." While <u>Strasnick</u> may show drawings or figures including some combination of textual, numeric, or other data, nowhere does <u>Strasnick</u> disclose "defining a uniform data structure for representing objects of different data types," as claimed. Therefore, nothing in <u>Fayyad</u> or <u>Strasnick</u> gives a reasonable expectation of success, or otherwise provides the proper motivation for modifying <u>Fayyad</u> to include defining a uniform data structure. <u>Strasnick</u> therefore fails to cure the admitted deficiencies of <u>Fayyad</u>.

Accordingly, no combination of <u>Fayyad</u> and <u>Strasnick</u> <u>et al.</u> disclose or suggest a combination including "defining a uniform data structure for representing objects of different data types." Applicants respectfully request the reconsideration and allowance of claims 4 and 5.

<u>Rejection of claims 7, 9-11, 16, 17, 19, 63 and 64</u>

The rejections of claims 7, 9-11, 16, 17, 63, and 64 under 35 U.S.C. §103(a) are respectfully traversed since a *prima facie* case of obviousness has not been made by the Examiner. To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the references, taken alone or in combination must disclose or suggest each and every element recited in the claims. Second, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of these requirements

must "be found in the prior art, and not be based on the applicant's disclosure." (See M.P.E.P. §2143) Applicants submit that these requirement have not been met for the following reasons.

Applicants submit that, by virtue of their dependence from independent claim 2, claims 7, and 9-11 each recite a combination including, for example, "defining a uniform data structure for representing objects of different data types." For the reasons described above, Applicants respectfully submit that Fayyad discloses only a single data type, and cannot therefore disclose or suggest at least "different data types." Applicants further submit that the J.C. Roberts IEEE paper does not cure this deficiency. J.C. Roberts concerns only "different ways of looking at the same information," (p.1) and is silent as to the data type of data visualized. Accordingly, it does not disclose or suggest "objects of different data types," nor does it disclose or suggest "defining a uniform data structure for representing objects of different data types." As a matter of law, the combination of J.C. Roberts and Fayyad cannot therefore render claims 7 and 9-11 obvious.

Independent claim 16 recites a combination including, for example, "displaying first graphical results of a first type analysis performed on selected attributes of a first data set, wherein the selected attributes comprise a plurality of data types." For the reasons described above, Applicants respectfully submit that Fayyad discloses only a single data type, and cannot therefore disclose or suggest at least "a plurality of data types." Applicants further submit that the J.C. Roberts IEEE paper does not cure this deficiency. J.C. Roberts concerns only "different ways of looking at the same information," (p.1) and is silent as to the type of data visualized. Accordingly, it does not disclose or suggest "a plurality of data types." Accordingly, Applicants submit that J.C. Roberts and Fayyad does not render obvious the combination recited in claim 16. Furthermore, Applicants submit that dependent claim 17 is also allowable, at least by virtue of its dependence from allowable claim 16.

11

Independent claim 19 recites a combination including, for example, "different types of data," "a first processing engine operative to modify a first type of data," and a second processing engine for creating a first high dimensional vector for a second type of data." For the reasons described above, Applicants respectfully submit that <u>Fayyad</u> discloses only a single data type, and cannot therefore disclose or suggest at least "different types of data." Applicants further submit that the J.C. Roberts IEEE paper does not cure this deficiency. J.C. Roberts concerns only "different ways of looking at the same information," (p.1) and is silent as to the type of data visualized. Accordingly, it does not disclose or suggest at least, "different types of data," "a first processing engine operative to modify a first type of data," and a second processing engine for creating a first high dimensional vector for a second type of data," as recited in claim 19. Accordingly, Applicants submit that the Examiner has failed to set forth a *prima facie* case of obviousness of claim 19 over J.C. Roberts and <u>Fayyad</u>.

<u>Rejection of claims 12 and 13</u>

The rejections of claims 12 and 13 under 35 U.S.C. §103(a) are respectfully traversed since a *prima facie* case of obviousness has not been made by the Examiner. To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the references, taken alone or in combination must disclose or suggest each and every element recited in the claims. Second, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of these requirements must "be found in the prior art, and not be based on the applicant's disclosure." (*See* M.P.E.P. §2143) Applicants submit that these requirement have not been met for the following reasons.

Dependent claims 12 and 13, by virtue of their dependence from claim 2, each recite a combination including, for example, "defining a uniform data structure for representing objects of different data types." For the reasons discussed above with regard to independent claim 2, from which claims 12 and 13 depend, Fayyad does not disclose this element. Applicants submit that the Magdi Mohamed IEEE article ("Mohamed") does not cure this deficiency. While Mohamed does disclose sequences, it does not disclose "different data types." Furthermore, while the combination of Mohamed and Fayyad would indicate that multiple data types exist, nothing in the references suggests modifying them to include "defining a uniform data structure for representing objects of different data types," or indicates a reasonable expectation of success of such a combination. Accordingly, the Examiner has failed to set forth a *prima facie* case of obviousness, and Applicants respectfully request the allowance of claims 12 and 13.

New claims 65-67

By this Amendment, Applicants have added new claims 65 –67 to more clearly recite what Applicants regard as their invention. Applicants respectfully submit that these new claims do not add new subject matter to this application. More specifically, Applicants submit that the subject matter of claims 65-67 may be found throughout the specification and claims as originally filed. In particular, Applicants have clarified the terms "sequence data type" and "categorical data type" to more particularly specify these features as they would be understood and defined by one of ordinary skill in the art. Applicants submit that at the interview, these claims were discussed with the Examiner and he indicated their allowability over the art of record.

Conclusion

In light of the foregoing amendments and remarks, Applicants respectfully request the timely reconsideration and allowance of pending claims 1-17, 19, and 63-67.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: May 23, 2003

By: _____ for

Richard V. Burgujian
Reg. No. 31,744

APPENDIX TO AMENDMENT OF MAY 23, 2003
VERSION WITH MARKINGS TO SHOW CHANGES MADE

AMENDMENTS TO THE CLAIMS

IN THE CLAIMS:

Please amend claim 16 as follows. A marked up version of the claim showing the changes made to effect the amendments is attached as an Appendix hereto.

16. (Amended) A method of identifying relationships among different visualizations of a plurality of data sets, each data set comprising a set of objects, comprising the steps of:

displaying first graphical results of a first type analysis performed on selected attributes of a first data set, wherein the selected attributes comprise a plurality of data types;

displaying second graphical results of a second type analysis performed on selected attributes of a second data set;

selecting certain objects represented in said first graphical results; and

highlighting corresponding objects represented by said second graphical results that correspond to aid certain objects.